CHAPTER 5

ENVIRONMENTAL CONSIDERATIONS FOR OPERATING AND MAINTENANCE

5-1. General. The manner in which construction and maintenance activities are carried out is a major factor affecting the environmental quality associated with flood control channel projects. This chapter identifies desirable concepts for environmental improvements that should be incorporated into work plans for construction and maintenance. These concepts are applicable to all types of flood control projects. Construction and maintenance procedures applicable to specific designs, such as levees or clearing and snagging, can be found in the corresponding sections of Chapter 4. Maintenance of local flood protection projects is governed by 33 CFR 208.10, ERs 1130-2-303, 1130-2-335, and 1130-2-339, and EM 1110-2-301. Maintenance requirements will be in accordance with Local Cooperating Agreements, and specified in the operation and maintenance manuals.

5-2. Erosion and Sediment Control. Erosion and associated sedimentation from work areas should be minimized by employing appropriate sediment control techniques. Erosion can be minimized by controlling runoff, performing work during the dry season, limiting the time that areas are disturbed, and employing temporary covers or mulches, such as wood chips or straw. Brush or fabric barriers, vegetative filter strips, and sediment basins can be used to trap sediment from eroding areas. Some soils can be chemically treated to reduce erosion of exposed surfaces, but chemical treatment depends on soil characteristics and is therefore site specific. As a general rule, stream fording, subaqueous construction, and amphibious operations should be avoided. Refer to WES IR EL-83-l and EL-85-2 for detailed guidance concerning all types of soil stabilization measures and erosion and sediment controls.

5-3. Minimizing Disturbance.

a. General. Construction and maintenance of flood control channels and structures should be planned and carried out to minimize ecological disturbance. Guidelines should specify preferred equipment; access controls; timing of work; and frequency, amount, and location of vegetation removal.

b. Preferred Equipment. Equipment used in channel maintenance should be a as small as feasible to minimize access requirements and disturbance of riparian vegetation. Channel work should be accomplished from one side, insofar as possible. Where mechanical mowing of banks is required, light equipment should be used to avoid damage to turf and nearby trees and shrubs.

c. Access Controls. The number and width of access routes should be minimized, and advantage should be taken of existing roads, trails, and clearings. Mowing of travelways and staging areas should not be required, and a permanently maintained travelway along the stream is not mandatory on all projects. Where a travelway is required, an uncleared buffer strip should be left along the channel. In some cases, recreational trails can double as maintenance travelways.

d. Considerations for Scheduling. Many factors, some of which have conflicting requirements, should be considered when scheduling construction of these projects. Peak migration or spawning periods should be identified so

that they are avoided wherever possible. Periods of intensive recreational usage should also be avoided. The success of establishing vegetation is largely dependent upon the time of planting. The dormant season is usually most favorable for the success of woody vegetation, but is also often associated with higher flow periods. On the other hand, for other vegetation, planting during the growing season is more desirable. Construction activities may favor lower flow periods because of ease of access and turbidity control. These and other local factors must be considered when scheduling construction for the specific project.

e. Frequency, Amount, and Location of Vegetation Removal. Maintenance frequency should be determined on an as-needed basis rather than at specified regular intervals. Vegetation removal for channel maintenance should be restricted to that necessary for proper operation of equipment and maintenance of channel capacity. Care should be taken to avoid damage to trees and shrubs left during project construction. Wildlife dens, burrows, and nesting sites should be protected to the extent feasible and commensurate with safe project operation.

5-4. Aquatic Plant Control.

a. General. Several management measures are available for preventing or controlling aquatic plant infestations that might reduce flow capacity or interfere with the use of flood channels. The control technique to be used is dependent upon the species of aquatic plant causing the problem, its magnitude, its location, and the characteristics of the channel. The degree of control required to bring the problem to an acceptable level must also be a consideration. See Dumas (1976a,b) and Long (1979) for further details on the identification and assessment of aquatic plant problems and for assistance in choosing control measures to be used. In cases where potential aquatic plant problems can be identified at a very early stage, technology called "prevention methodology" is available to minimize the problem such that large-scale control operations are avoided (see Killgore 1984).

b. Aquatic Plant Control Techniques. Aquatic plants that cause problems in flood control channels are of two basic types: floating plants such as waterhyacinth, and submersed plants such as hydrilla or Eurasian watermilfoil that are rooted in the channel substrate. Tarver et al. (1979) present pictures and descriptions of these species. Biological, chemical, and mechanical methods, individually or in combination, may be used to control aquatic plants.

(1) Biological control. Biological control employs organisms that feed on the target organism or affect it in some other way to reduce its numbers or growth. Biological control agents potentially available for use in aquatic plant control are insects for control of alligatorweed (Environmental Laboratory 1981) and waterhyacinth (Sanders et al. 1979), plant pathogens for control of waterhyacinth (Sanders et al. 1979), and herbivorous fish (Addor and Theriot 1977) for control of submersed species. A computer model is available from WES as a decision-making aid in planning for the use of herbivorous fish. The model runs on an IBM personal computer with color graphics. In general, biological methods are relatively inexpensive but take considerable time to become effective.

(2) Chemical control. The application of safe and effective chemical agents is a proven method for aquatic plant control. Approved chemical agents for aquatic use may be liquids that can be sprayed onto floating plants or inserted under the water for controlling submersed plants, or they may be solids that can be applied by spreaders, for example, over the surface of the channel. Chemical methods are generally readily available and are relatively inexpensive when compared to other methods. See Dumas (1976b) and Westerdahl and Getsinger (in preparation) for lists of available chemical agents and techniques for their use. These documents contain valuable information on chemicals for aquatic use; however, to obtain the most current information on effective and approved products, the user should consult his Corps District contact for aquatic plant control.

(3) Mechanical control. Mechanical devices for controlling aquatic plants vary from deflecting booms and screens or clipping bars mounted on boats to more sophisticated systems whereby the plants are cut and removed from the water to disposal areas. Although mechanical methods are generally rather costly, they are sometimes desired over other methods since no organisms or chemicals are added to the environment. See Culpepper and Decell (1978), Dumas (1976a), and Smith (1980) for descriptions of mechanical control hardware and techniques that may be applicable for controlling aquatic plants in flood control channels.